3-2013

A Resilience Success Story: How Significant Losses were Avoided during Hurricane Isaac

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FEMA

LOSS AVOIDANCE STUDIES

Southeastern Louisiana

Hurricane Isaac, 2012

Hazard Mitigation, Region 6

DR-4080-LA

FEMA

Hurricane Isaac
Lake Pontchartrain, August 28

Hurricane Isaac
Trees Down, August 30th

Hurricane Isaac
Plaquemines Parish, September 1st

Hazards & Performance Analysis (HPA) On Site September 3rd

Hurricane Isaac (Category 1)

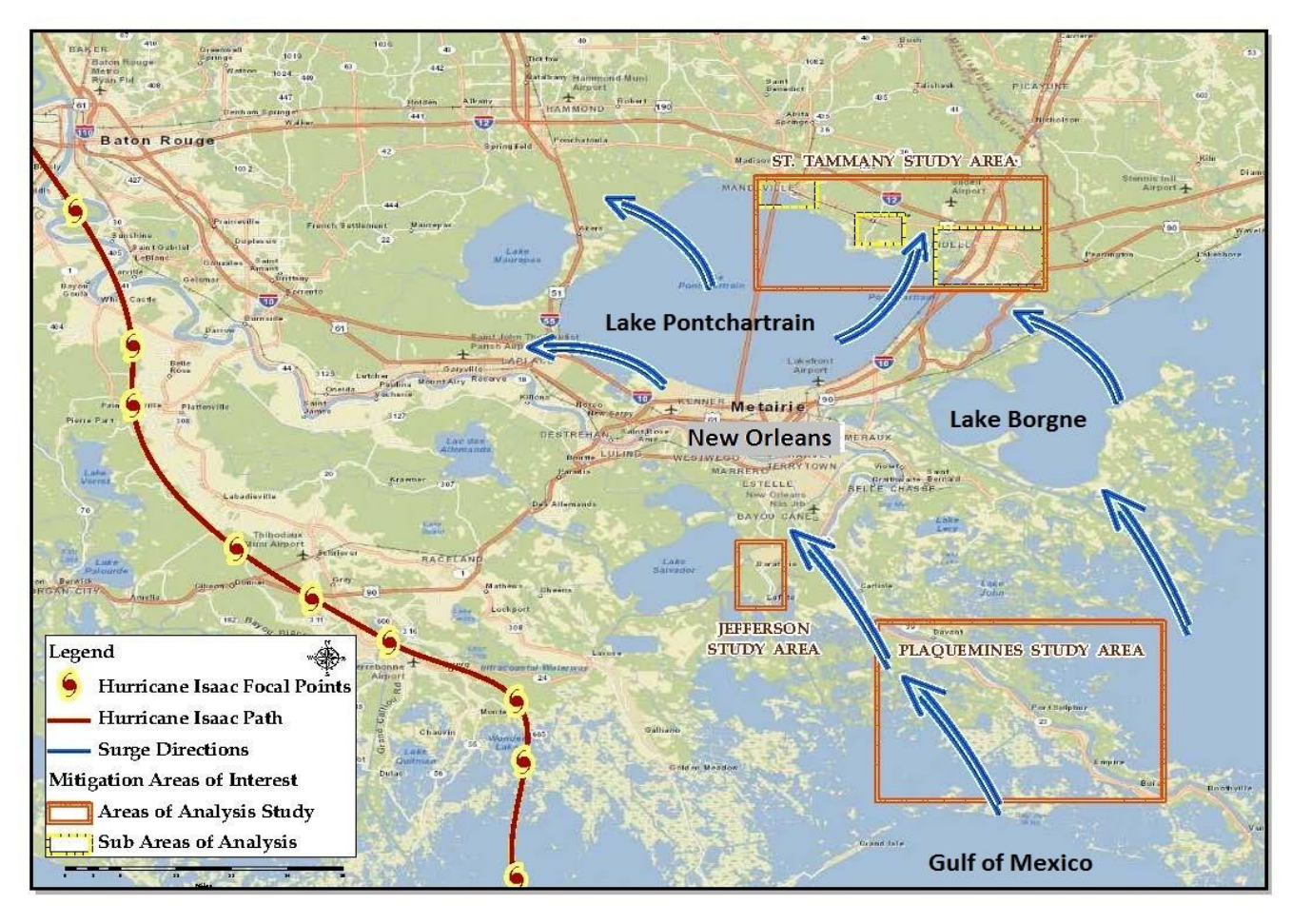
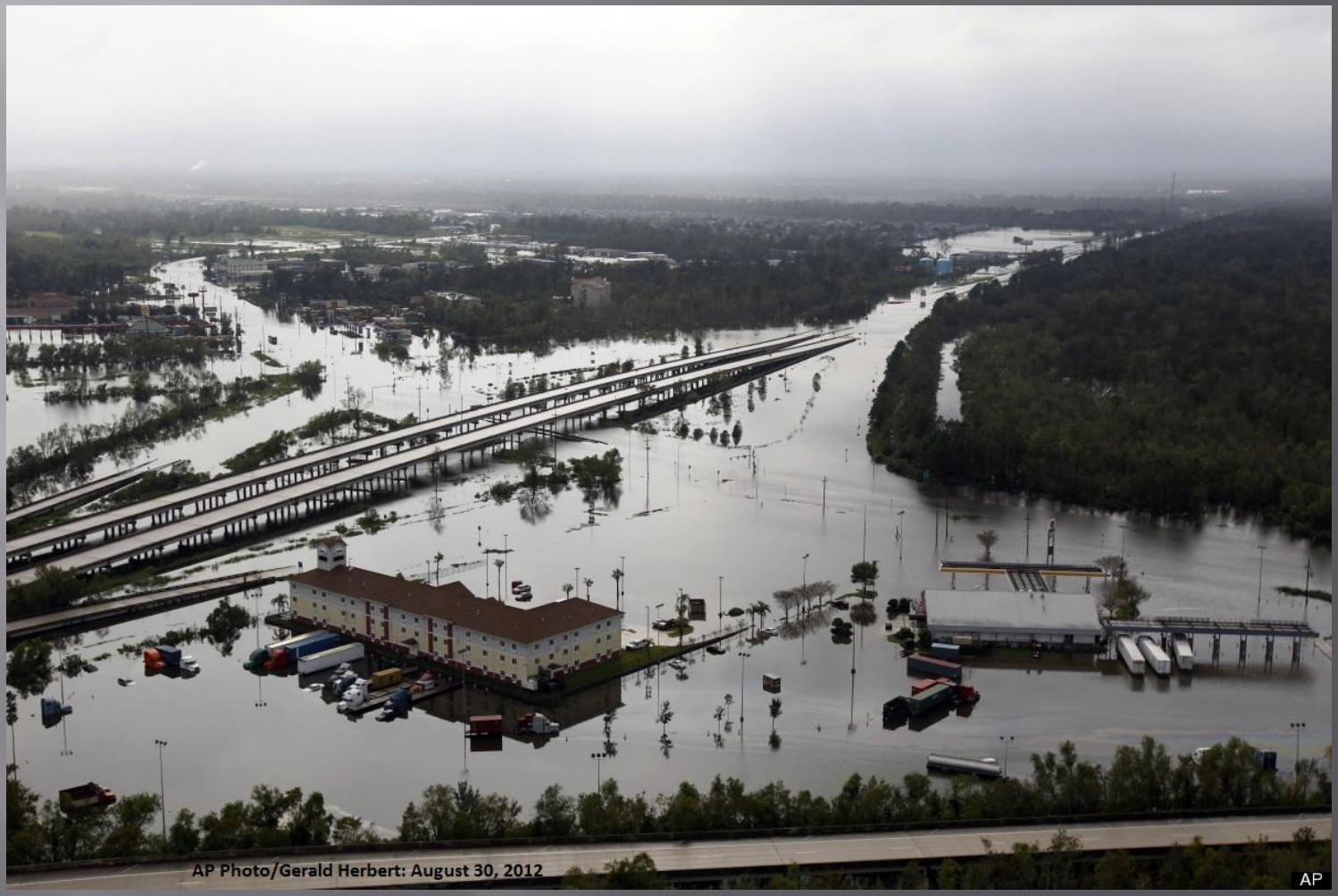


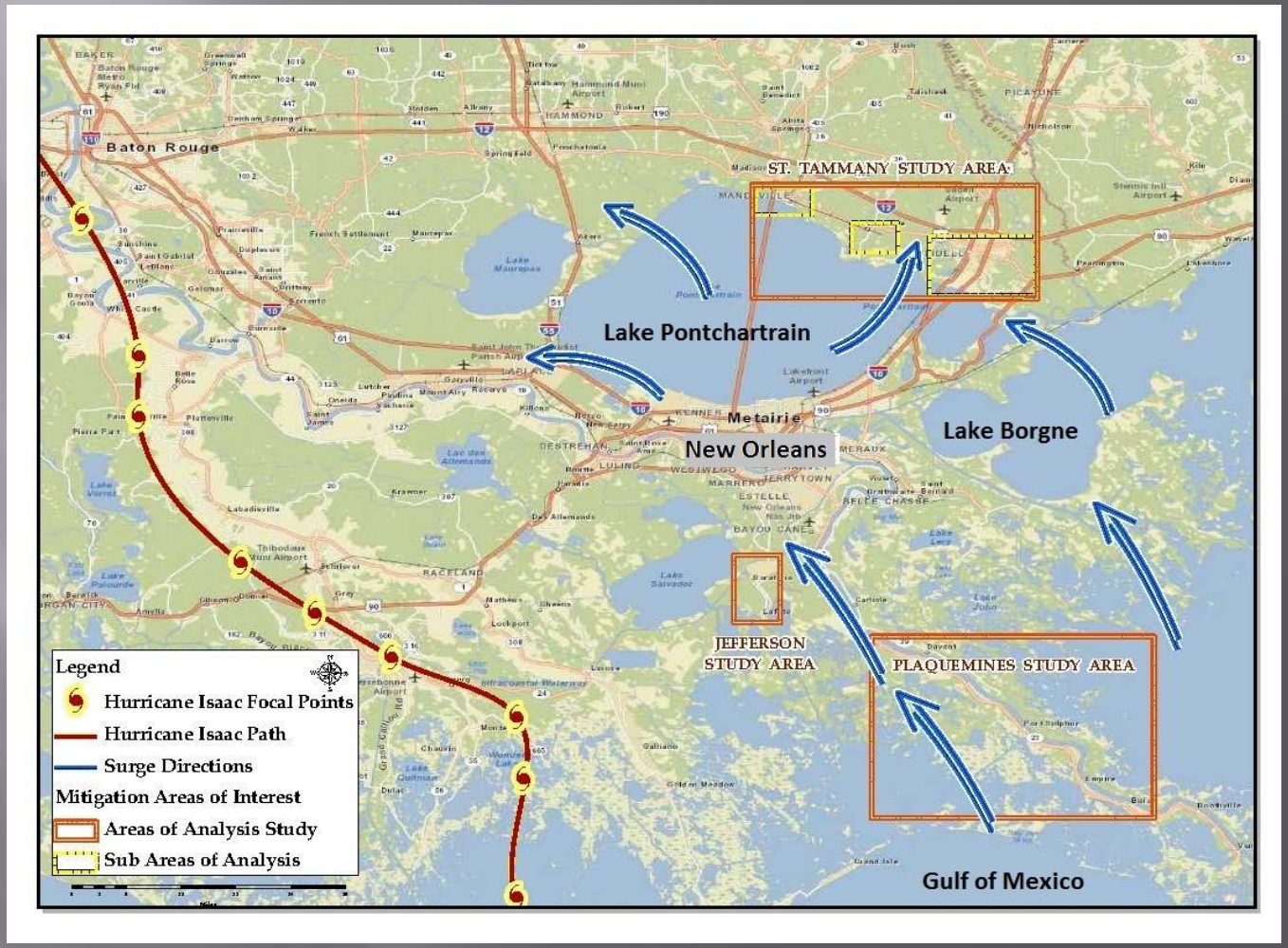
Figure 3. Hurricane Isaac Storm Track and Storm Surge

Hurricane Isaac

Flooding Across I-10, August 30, 2012



Hurricane Isaac 2012



Hurricane Isaac Storm Track and Storm Surge

Louisiana Storm History Past 30 Years (1982-2012)

#	Year	Month	Name	Category	Max Wind
1	1985	August	Danny	1	90
2	1985	September	Elena	3	115
3	1985	October	Juan	1	85
4	1986	June	Bonnie	1	85
5	1988	September	Florence	1	75
6	1992	August	Andrew	3	115
7	1995	October	Opal	3	115
8	1997	July	Danny	1	85
9	1998	September	Georges	2	110
10	2002	October	Lili	1	75
11	2005	August	Katrina	3	125
12	2005	September	Rita	3	115
13	2008	August	Gustav	2	100
14	2012	August	Isaac	1	85

Figure 4 *Data from *Louisiana Hurricane History*, David Roth, National Weather Service, Camp Springs, MD

General Observations Isaac vs. Katrina

1. The Greater New Orleans Area was adequately protected by the modified (HSDRRS) levee system- which had just been completed.
2. Critical Facilities that had been rebuilt and elevated post-Katrina, performed well.
3. Homes that had been elevated post-Katrina performed well during Isaac. Non elevated homes did not.

Conclusion: More homes need to be elevated!

Loss Avoidance Study (LAS)

Figure 1. Elevated Property

Figure 2. What would have happened!

Losses Avoided are determined by taking a technical assessment of an elevated property and determining what *would have happened* to it during a flood event had the property *not been elevated*. The losses avoided are determined in dollars.

Loss Avoidance Study (LAS)
Introduction

- Following Hurricane Katrina (2005), millions of dollars were invested in Hazard Mitigation (HM) projects (specifically elevation projects).
- Hurricane Isaac (2012) provided an opportunity to evaluate and analyze the performance of many of these HM measures.
- A LAS provides hard data to validate that the mitigation (elevation) measures are successful and losses have been avoided.
- A LAS provides justification for existing and future mitigation projects and funding.

LAS Methodology
Pre-Conditions

- A hazard event (flood) has to have taken place.
- A mitigation project (elevation) has to be in place (completed) prior to the hazard event.
- A high water mark (HWM) from the event has to be located for the subject property.
- The pre-mitigation finish floor elevation (FFE) has to be known or determined.
- The post-mitigation FFE has to be determined.
- From the above data, a pre-mitigation flood depth can be determined- the flood depth that would have occurred ***had the property not been elevated.***

Case Study
St. Tammany Parish

PROP ID	BFE *	FFE BM	FFE AM	EABF	GRADE	HWM	SQ. FT.	STRUCTURE TYPE	MITIGATION COST	DATE
1832	AE 12	5.5	15.1	3.1	3.0	8.00	2000	1.WF P	$88,000	2006

Completed Elevation Project

Estimated Flood Insurance / Year
BFE + 3 = $
BFE + 0 = $$
BFE - 1 = $$$
BFE - 3 = $$$$$

FFE After Mitigation = 15.1

BFE = AE 12'

Isaac High Water Mark = 8.0

FFE Before Mitigation = 5.5

LAS Methodology
3 Categories of Losses Avoided

1. Building Repair Costs

   (Structural, Electrical, Mechanical, Drywall, Cabinets, Flooring)

2. Contents Damages

   (Furniture, Appliances, Electronic Equipment, Clothing, Power Tools, Lawn Mower)

3. Displacement Costs

   (Costs required to provide living expenses while homeowners are out of the home while repairs are being made- includes hotel/rental expenses and meals)

Category 1.
Building Repair Costs

1. The Building Replacement Value (BRV) of the property must be determined. ($115.00/SF)

2 The Square Footage (SF) of the property must be known, then multiplied by $115.00/SF.

BRV= 2000 SF X $115 = $ 230,000

3. The Flood Depth needs to be known and plugged into a Depth-of Damage Calculation, in order to arrive at the Building Repair Costs (2.5').

Residential Building Depth Damage Function

Source: USACE

Building Type	1 Story without Basement	2 Story Without Basement	Mobile Home
Flood Depth in Feet	Percent Damage	Percent Damaged	Percent Damaged
-1.5 ≤ > -0.5	2.5	3	0
- 0.5 ≤ > 0.5	13.4	9.3	8
0.5 ≤ > 1.5	23.3	15.2	9.4
1.5 ≤ > 2.5	32.1	20.9	63
2.5 ≤ > 3.5	40.1	26.3	73
3.5 ≤ > 4.5	47.1	31.4	78

2.5' (Flood Depth) = 40.1% of Damage
BRV ($230,000) X 40.1% of Damage Function = $ 92,230.00

Building Repair Costs = $92,000 (Losses Avoided)

LAS Methodology
Category 2. Contents Losses

1. The "Contents" Value (CV) of the property must be known or determined.

2. CV = BRV ($230,000) X 30% = $ 69,000

3. From the above data the LAS can calculate a flood-depth-of-damage calculation for the contents that were damaged or destroyed.

Contents Depth Damage Function

Source: USACE Generic

Building Type	1 Story without Basement	2 Story Without Basement	Mobile Home
Flood Depth in Feet	Percent Damage	Percent Damaged	Percent Damaged
-1.5 ≤ > -0.5	2.4	1	0
- 0.5 ≤ > 0.5	8.1	5	12
0.5 ≤ > 1.5	13.3	8.7	66
1.5 ≤ > 2.5	17.9	12.2	90
2.5 ≤ > 3.5	22	15.5	90
3.5 ≤ > 4.5	25.7	18.5	90

Contents Value (CV) $69,000 X 22%= $15,180

Contents Losses Avoided = $ 15,000

LAS Methodology
Category 3. Displacement Costs

1. Displacement costs are based on the average household size of 2.61 people (*2010 census data*.)

2. Displacement costs are based on the GSA per-diem rates for lodging and meals in SE Louisiana.

   $88 Lodging + ($49 Meals X 2.61) = $216/Day

3. A Depth-of Damage Function is used that determines the number of days displaced.

Displacement Depth Damage Function

Source: USACE Generic

Flood Depth in Feet	Displacement in Days
0.5 ≤ > 1.5	45
1.5 ≤ > 2.5	90
2.5 ≤ > 3.5	135
3.5 ≤ > 4.5	180
4.5 ≤ > 5.5	225

Per Diem Cost/Day $216 X 135 Days = $ 29,160

Displacement Losses Avoided = $29,000

LAS Methodology
Total Losses Avoided

- For our case study property that would have flooded 2.5' ***had it not been elevated*** we add together:

1. The Building Repair Costs: $ 92,000
2. The Contents Losses: $ 15,000
3. And the Displacement Costs: $ 29,000

For a Total ***Losses Avoided:*** ***$ 136,000***

LAS Methodology
Losses Avoided Vs. Cost of Mitigation

Property ID	Water Depth In feet above FFE Pre-Mitigation	Total Losses Avoided	Total Cost of Mitigation	Difference (+ or -)	Loss Avoidance Ratio
1832	2.5′	$136,000	$88,000	$48,000	1.55

Losses Avoided ÷ Mitigation Cost = LA ratio

$136,000 ÷ $88,000 = 1.55

A ratio *greater-than-one* indicates that project benefits have exceeded project costs and the mitigation activity is performing successfully.

LAS Methodology
Loss Avoidance Ratio

- A Loss Avoidance Ratio *less-than-one* indicates that the mitigation benefits have not yet exceeded project costs.
- However, the useful life of an elevation project is more than 30 years and the ratio only represents one storm event.
- Even if the ratio was .50, it can be assumed that over the life span of the mitigation project, the cost of the mitigation should pay for itself many times over.

LAS for Southeastern Louisiana

Mitigation HPA completed analysis on 95 post-Katrina elevated properties in 3 Parishes.

Loss Avoidance Study for Southeast Louisiana DR-4080-LA

Parish	# of Projects	Average Water Depth	Total Losses Avoided	Total Cost of Mitigation	Difference (+ or -)	Loss Avoidance Ratio
St. Tammany	62	1.58	4,919,588	7,241,781	(2,322,193)	0.68
Jefferson	23	2.20	2,241,140	2,361,247	(120,108)	0.95
Plaquemines	10	3.51	1,070,117	596,800	473,317	1.79
Total	95	2.43’	$8,230,845	10,199,828	(1,968,983)	0.81

LAS Conclusions

This Loss Avoidance Study demonstrates that Federal, State and local funds used to elevate properties provides a cost-effective long term mitigation measure that protects lives and property from future hazards.

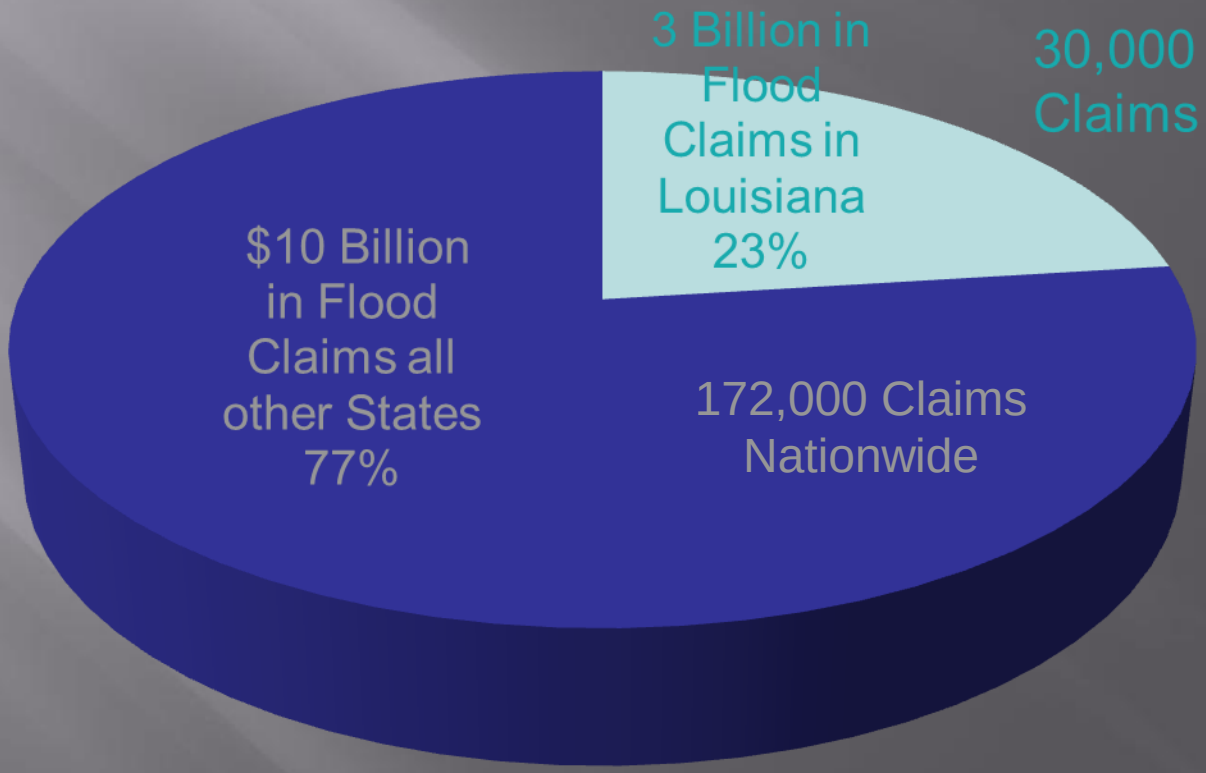
Non-elevated post-Isaac

Elevated pre-Isaac

Repetitive Loss Flood Claims

As of 12/31/2012

3 Billion Dollars of Claims in Louisiana
13 Billion Dollars Total Nationwide



Repetitive Loss in Plaquemines Parish

- As of 12/31/2012:

  375 repetitive loss structures having 952 claims totaling $78,118,699.64

  - Average Loss per Structure 2.5
  - Average Claim per Structure $ 208,000

  Conclusion: Plaquemines Parish would benefit by elevating many of these structures.

LAS Way-Ahead

- The LAS will be made available to FEMA headquarters and Region 6, that they may demonstrate to their stakeholders the economic performance of post-Katrina mitigation.
- Moving forward, the LAS will be used to encourage and help equip local communities to justify and pursue elevation projects.
- The LAS demonstrates that elevation projects help communities minimize losses, recover quickly, be resilient, stabilize the economic base and have confidence and hope for the future.

LOSS AVOIDANCE STUDIES

Southeastern Louisiana

Hurricane Isaac, 2012

Hazard Mitigation, Region 6

DR-4080-LA

FEMA

BW-12

The Biggert-Waters Flood Insurance Reform Act of 2012

BW-12: What's Changing

- Subsidies to be phased out
  - Non-primary residences
  - Business properties
  - Severe repetitive loss properties (1-4 residences), and properties where claims payments exceed fair market value

- New policies to be issued at full-risk rates
  - After the sale/purchase of a property
  - After a lapse in insurance coverage
  - After substantial damage/improvement
  - For properties uninsured as of BW-12 enactment
  - As new or revised Flood Insurance Rate Maps are issued (grandfathered rates planned to be phased out over 5 years)

Changes for Non-Primary Residences

- Subsidized premium rates for "pre-FIRM" properties in high-risk
  (A or V) zones will be phased out
- Rates will increase 25 percent per year until they reflect the full-risk rate.
- Changes effective January 1, 2013, at policy renewal

Pre-FIRM:
Built before the community's first Flood Insurance Rate Map became effective and not been substantially damaged or improved

Non-primary residence:
A building that will be lived in for less than 80 percent of the year

Changes to Other Subsidized Rates

- Rates on pre-FIRM commercial buildings
  Increase by 25% a year until they reach full-risk rates.
- Rates for repetitively flooded buildings
  (known as Severe Repetitive Loss properties) of one to four residences increase 25% a year until they reach full-risk rates

  Includes buildings with cumulative flood insurance payments that meet or exceed fair market value

- These changes planned to start October 1, 2013

Direct Move to Full-Risk Rates

- After the sale/purchase of a property
  Subsidized rates can no longer be assigned to the new owner.
- After a policy lapse
  Policyholders should know that allowing a policy to lapse could be costly.
- When a new policy is issued
  Policies for buildings uninsured as of the date BW-12 was enacted
- These changes also planned to start October 1, 2013